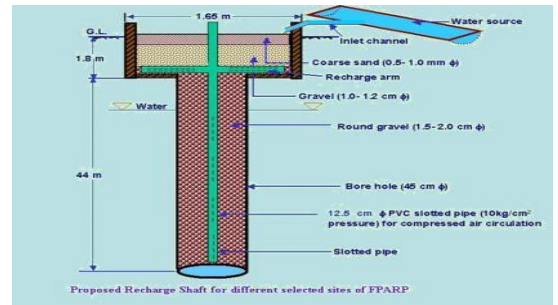
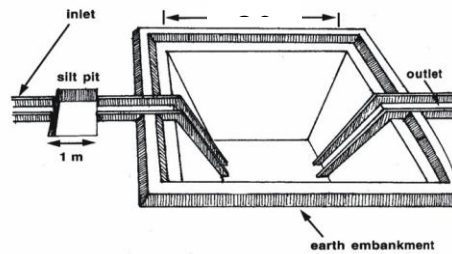




**CENTRAL GROUND WATER BOARD**  
MINISTRY OF WATER RESOURCES,  
RIVER DEVELOPMENT & GANGA REJUVENATION  
GOVERNMENT OF INDIA



Excavated/dugout farm pond



**ARTIFICIAL RECHARGE TO GROUND WATER AND  
WATER CONSERVATION PLAN OF RANIWARA  
BLOCK, DISTRICT JALORE, RAJASTHAN**

Western Region, Jaipur  
January 2017

# ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION PLAN OF RANIWARA BLOCK, DISTRICT JALORE

## Plan at a Glance

1.	<b>Area of the Raniwara Block</b>	<b>1009.75 sq. km.</b>
2.	<b>Area identified for Artificial Recharge</b>	<b>918.62 sq km</b>
3.	<b>Dynamic Ground Water Resources (as on 31.03.2011)</b>	
	Net Ground Water Availability	<b>55.96 MCM</b>
	Annual Ground Water Draft	<b>116.65 MCM</b>
	Stage of Ground Water Development	<b>208.45%</b>
4.	<b>Volume of water to be harnessed</b>	<b>0.596 MCM</b>
	<b>Volume of water available for recharge through RS</b>	<b>0.592 MCM</b>
	<b>Volume of water available for recharge through PT</b>	<b>-</b>
5.	<b>Volume of unsaturated aquifer zone available for recharge</b>	<b>2289.897 MCM</b>
6.	<b>Total number of structures to be proposed</b>	
	<b>Recharge structures</b>	<b>17 shafts in 17</b>
	Existing village pond with recharge shaft/ well	<b>Nos. of existing</b>
		<b>village ponds</b>
	Percolation Tanks	<b>--</b>
	Sprinkler Irrigation	<b>300 ha</b>
	<b>Expected Annual GW recharge</b>	<b>0.474 MCM</b>
	<b>Provision for supplemental irrigation, thus reducing GW withdrawal for irrigation</b>	<b>0.24</b>
	<b>Total recharge/ saving of ground water</b>	<b>0.714 MCM</b>
7.	<b>Estimated Cost</b>	<b>2.562 crore</b>
	Artificial Recharge Plan	0.85 crore
	Sprinkler Irrigation	1.50 crore
	Piezometer construction	0.09 crore
	Operation and maintenance	0.122 crore

# ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION PLAN OF RANIWARA BLOCK, DISTRICT JALORE

## Introduction

The **Raniwara Block, district Jalore** is one of the over exploited blocks of Rajasthan and is under severe stress, as evident from the stage of ground water development, which has attained an alarming level of **208.45%**. 918.62 sq. km. area is potential zone area and thus feasible for artificial recharge.

## Location of the block

The Raniwara Block of Jalore District covering an area of 1009.75 Sq. Km. falls in central part of Jalore District and is located between North latitudes 24°37' & 24°59' and East longitudes 71°59' & 72°22'.

## Surface Water Availability

As per the studies carried out by Water Resources Department (WRD), Government of Rajasthan there is very little surplus water available for further development at 75% dependability. Based on the data made available from GWD, the surplus runoff available at 75% dependability level has been worked out for the zones as part of watershed within the block. The nature of aquifer (Alluvium/ Hard rock) is also considered while computing the number of Artificial Recharge structures feasible.

Accordingly about 0.596 MCM has been considered for recharge plan in the block. Optimum utilization of rainwater runoff depends on availability of land, feasible conditions, etc. Volume of Aquifer available for Artificial Recharge is given in **Table.1**

## Supply Side Management

### Feasible Artificial Recharge and Water Conservation Structures

About 0.035 mcm/year surplus has been considered for each recharge shaft and 0.2 mcm/year for percolation tank wherever feasible. The areas with shallow water level (<5m) have not been considered for construction of Artificial Recharge Structures

The number of Recharge Shaft is decided based on the number of suitable ponds available within the zone. If still some surplus remained unallocated, than few Percolation tanks are proposed at suitable locations. However, in some of the blocks entire available surplus cannot be utilized due to non availability of ponds for Recharge shaft or suitable location for Percolation tanks. Zone wise number of Recharge Structures proposed to be constructed is given in **Table 2**.

**Table 1: Volume of Aquifer available for artificial recharge**

District	Block	Area of Block (Sq.km.)	Potential area suitable for recharge (Sq.km.)	Type of Aquifer	Area feasible for artificial recharge (Sq km)	Sp Yield	Average DTW (mbgl) NOV 2013	Thickness of unsaturated zone 3 m below ground level (m)	Volume of sub surface storage space available for artificial recharge (MCM)
JALORE	RANIWARA	1009.75	918.62	SR	699.87	0.100	35	32	2239.584
				HR	218.75	0.020	14.5	11.5	50.313

**Table 2: Number of recharge structure**

ZoneCode	Sub_Basin	Type of Aquifer	Zone-Area (sq. km.)	Total Surplus (mcm)	Water Level >5m	Feasible_RS_Prop	Feasible_PT_Prop
Luni_Luni_084_RJ1905_AL	Luni	SR	54.163	0.005	Y	0	0
Luni_Sagi_087_RJ1905_AL	Sagi	SR	297.133	0.592	Y	17	0
Luni_Sagi_088_RJ1905_HR	Sagi	HR	142.498	0.000	Y	0	0
Other Nallahs Of Jalore_Other Nallahs Of Jalore_001_RJ1905_AL	Other Nallahs Of Jalore	SR	93.852	0.000	Y	0	0
Other Nallahs Of Jalore_Other Nallahs Of Jalore_002_RJ1905_AL	Other Nallahs Of Jalore	SR	55.399	0.000	Y	0	0
Other Nallahs Of Jalore_Other Nallahs Of Jalore_006_RJ1905_AL	Other Nallahs Of Jalore	SR	7.958	0.000	Y	0	0
Other Nallahs Of Jalore_Other Nallahs Of Jalore_007_RJ1905_AL	Other Nallahs Of Jalore	SR	366.240	0.000	Y	0	0
Other Nallahs Of Jalore_Other Nallahs Of Jalore_008_RJ1905_AL	Other Nallahs Of Jalore	SR	1.723	0.000	N	0	0
Other Nallahs Of Jalore_Other Nallahs Of Jalore_009_RJ1905_AL	Other Nallahs Of Jalore	SR	38.842	0.000	Y	0	0
				<b>0.596</b>		<b>17</b>	<b>0</b>

## Recharge Shaft

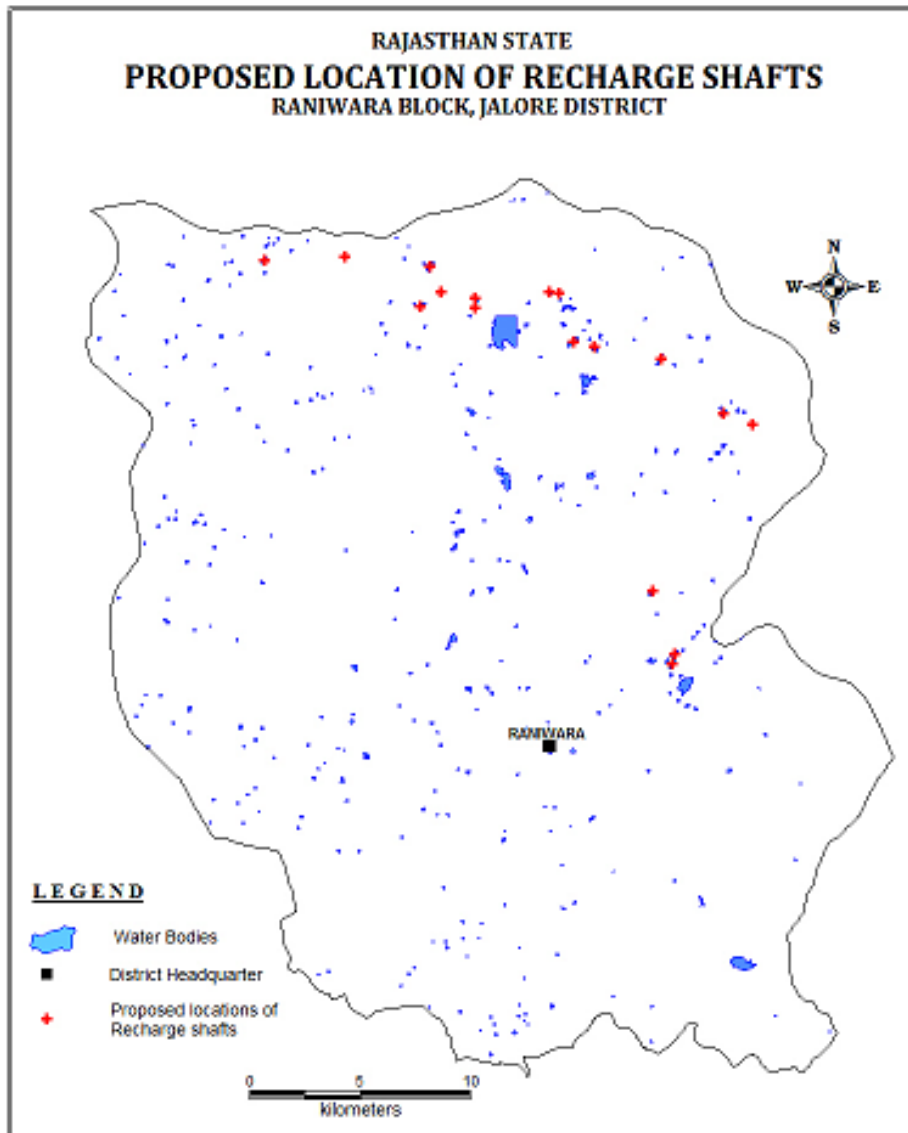
It is proposed to construct Recharge Shaft in existing ponds. The selected ponds should be atleast 3m deep and shallow ponds will be deepened accordingly. It is proposed that the inlet for the Recharge Shaft should be atleast 1m above bed of pond so that the pond retains adequate water for use by villagers.

. The tentative location of villages for construction of recharge shaft/well in existing village pond and their cost estimates are shown in Fig 1 and Table 3.

**Table 3: Tentative locations of village for village pond with recharge shaft**

S.No.	Village	Long	Lat	Watershed	No of Shafts	Unit cost (Rs in lac)	Total cost (Rs in lac)
1	Samrani	72.078	24.949	Luni_Sagi_087_RJ1905_AL	1	5	5
2	Chatwara	72.114	24.950	Luni_Sagi_087_RJ1905_AL	1	5	5
3	Sanwlawas	72.152	24.947	Luni_Sagi_087_RJ1905_AL	1	5	5
4	Chatwara	72.148	24.930	Luni_Sagi_087_RJ1905_AL	1	5	5
5	Sanwlawas	72.157	24.936	Luni_Sagi_087_RJ1905_AL	1	5	5
6	Bandhar	72.172	24.933	Luni_Sagi_087_RJ1905_AL	1	5	5
7	Bandhar	72.172	24.929	Luni_Sagi_087_RJ1905_AL	1	5	5
8	Ropsi	72.206	24.936	Luni_Sagi_087_RJ1905_AL	1	5	5
9	Ropsi	72.210	24.936	Luni_Sagi_087_RJ1905_AL	1	5	5
10	Baretha	72.216	24.916	Luni_Sagi_087_RJ1905_AL	1	5	5
11	Baretha	72.226	24.914	Luni_Sagi_087_RJ1905_AL	1	5	5
12	Kori Chaupawatan	72.256	24.909	Luni_Sagi_087_RJ1905_AL	1	5	5
13	Bilar	72.283	24.887	Luni_Sagi_087_RJ1905_AL	1	5	5
14	Basra Bhoja	72.297	24.882	Luni_Sagi_087_RJ1905_AL	1	5	5
15	Akhrad	72.252	24.814	Luni_Sagi_087_RJ1905_AL	1	5	5
16	Tejawas	72.262	24.788	Luni_Sagi_087_RJ1905_AL	1	5	5
17	Tejawas	72.260	24.784	Luni_Sagi_087_RJ1905_AL	1	5	5
					<b>17</b>		<b>85</b>

**Fig: 1: Tentative location of Recharge Shaft**



## **Demand Side Management**

### **Efficient Irrigation:**

In Flood/ furrow irrigation method more than 50% of applied water is wasted through seepage to deeper levels, local inundation causes loss through evaporation and it leaches out the nutrients from the plants. While through drip and sprinkler irrigation

method, wastage through irrigation losses could be minimized. Ground water usage can be minimized drastically by using HDPE pipes. Initially the scheme can be proposed to be started in 300 ha area, which is worst affected showing deepest water level and declining trends. The area is to be finalized based on land holdings, willingness of farmers and No Objection certificate from the land owner.

## Impact Assessment and Monitoring

Assessment of impact of the artificial recharge schemes implemented is essential to assess the efficacy of structures constructed. It helps in identification of cost-effective recharge mechanisms for optimal recharge into the ground water system. It also helps to make necessary modifications in site selection, design and construction of structures in future.

It is proposed to construct 15 piezometers, at suitable locations for monitoring of water levels, in the vicinity of proposed recharge structure.

## Revival, Repair of Water Bodies

The existing ponds and tanks with time loose their storage capacity as well as the natural ground water recharge through these water bodies has also become negligible due to siltation and encroachment by farmers for agriculture purposes. There are several such villages where ponds/ tanks are in dilapidated condition. These existing village tanks, which are normally silted and damaged, can be modified to serve as recharge structure in case these are suitably located to serve as percolation tanks. Through desilting, coupled with providing proper waste weir, the village tanks can be converted into recharge structure.

## Financial Outlay of the Plan

The total estimated cost of the Plan is Rs. 2.562 cr. The tentative cost estimates of the various activities of the Plan are shown in Table 4 & 5. The unit rates are as followed by the Govt. of Rajasthan (BSR).

**Table 4: Cost of the recharge structures**

Cost Recharge Shaft Rs in crs (Unit cost Rs 0.05 cr for alluvium and Rs 0.026 cr for hard rock)	Cost of Percolation Tank in Rs in crs (Unit cost Rs 0.4 cr)	Cost of Sprinkler irrigation in Rs (Unit cost 0.005 cr/ha)
Soft rock – 0.85	-	1.50

**Table 5: Tentative cost of different activities**

Feasible Artificial Recharge & Water Conservation structures/ activities	Tentative Design	Quantity (in nos. or area in ha)	Rainwater harvested (mcm ) or No. of sprinklers (/ha)	Tentative unit cost (in Rs lakh)	Total tentative cost (in Rs lakh)	Expected Annual GW recharge/ conservation (mcm) @ 0.8 mcm/structure
<b>Recharge Structures/ Activities</b>						
Recharge shaft within the pond /tanks	Alluvium – Depth 80m, Dia: 10-12” with filter pit	17	0.592	5	85	0.474
	Hard rock: Depth –60m, Dia 10-12”with filter pit	-	-	-	-	-
Percolation tanks (3 fillings)	200m*200m*1.5 m	-	-	-	-	-
Water Conservation Measures	Sprinkler Irrigation	300 ha	25	0.5/ha	150	0.24
		<b>Total</b>			<b>235</b>	<b>0.714</b>
<b>Impact assessment &amp; Monitoring</b>						
Piezometer	50 – 80 m	15		0.6	9	
<i>Impact assessment will be carried out by implementing agency</i>						
O & M - 5% of total cost of the scheme					12.20	
<b>TOTAL</b>					<b>256.20</b>	<b>0.714</b>

*Note: Type, number and cost of structure may vary according to site after ground verification*